PERSONALITY TRAITS OF META COGNITIVE FUNCTIONING AMONG TEACHER TRAINEES

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ABSTRACT

Metacognition is one of the most actively investigated cognitive processes in contemporary research in developmental and instructional psychology. Metacognition is a form of cognition, a second or higher order thinking process which involves active control over cognitive processes. It could also be defined as thinking about thinking or as a "person's cognition about cognition". Metacognition is related to different disciplines cognitive psychology, developmental psychology and philosophy of mind etc. So this topic as a research spreads a wide umbrella of several research problems needs to be investigated. So as a scholar of education and a teaching faculty I found this subject area very wide and crucial in terms of analyzing the effect of Metacognition and related traits on the personality and decision making of a teacher trainee.

Introduction

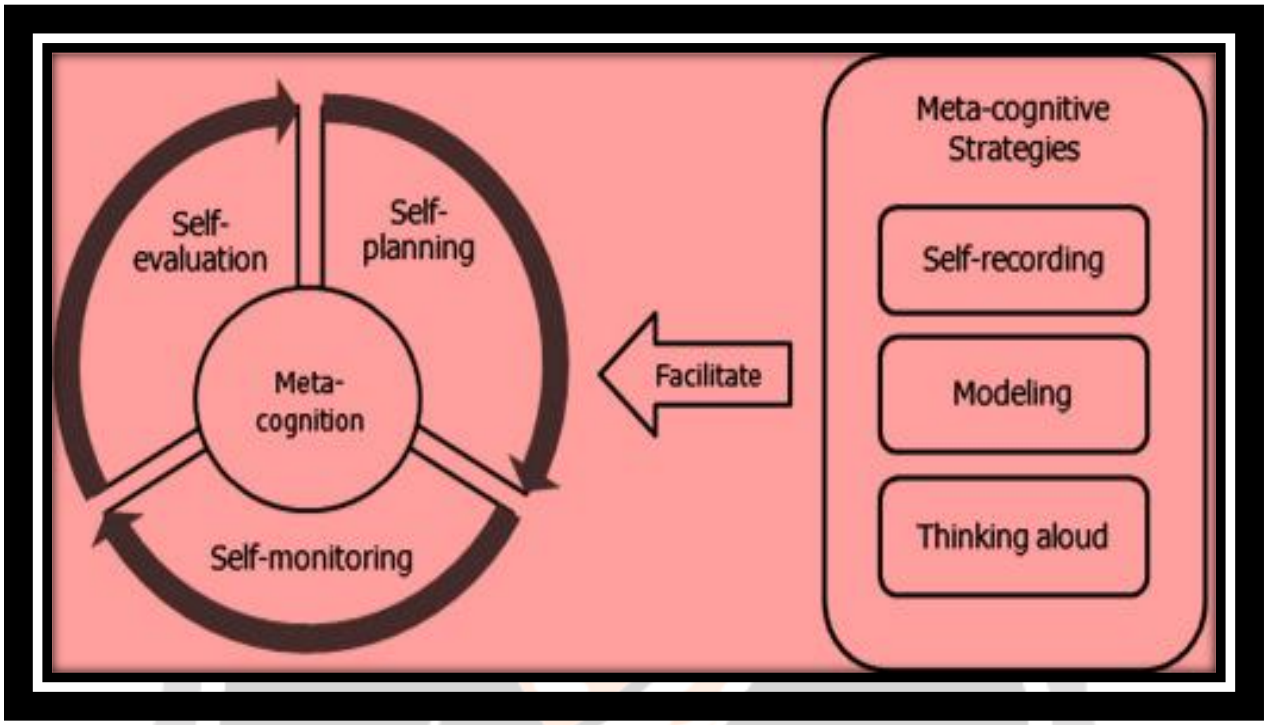
*The important things to acquire from the course were not the text books factoids, but rather, the learning to learn the skills and the skills in accessing a knowledge base that form the heart of Metacognition (**Sternberg, 2009**).*

In 21st century all fields of life have experienced change due to knowledge and information explosion. Teacher Education sub sector has also experienced new diversities such as teaching styles, teaching methodologies, intelligence, learning styles, learning techniques, learning disabilities, emerging technologies and cognition etc. The question arises whether teachers' training institutes are considering these diversities.

Teacher education offers a variety of classroom methods and techniques to trainee teachers, but it doesn't make certain teachers to understand when, why, and how to use them. Consequently teachers remain dormant, which resulted serious problems in classroom communication. Hence teachers were relatively unsuccessful in setting lesson objectives, activities, and engaging students. Consequently, teachers need to think carefully about what they present during a lesson and how they provide students with important information (**Child, 1995**).

Research studies indicated that teachers who are aware of their own Metacognitive functioning tend to play a more significant role in helping learners develop skills in Metacognition (**Daley, 2002**). Similarly, different researches also indicate that learners who are aware of their thinking are more strategic and perform better than those who are unaware (**Rivers, 2001**). While there are several approaches to Metacognitive instruction, the most effective involve providing the learner with both knowledge of cognitive processes and strategies (to be used as Metacognitive knowledge), and practice in using both cognitive and Metacognitive strategies and evaluating the outcomes of their efforts (**Livingston, 1996**).

Figure 1.1: Metacognitive Strategies and Its Facilitations



Source: Livingston, 1996

Metacognition has a number of concrete effects on learning. It plays an important role in oral comprehension, reading comprehension, problem solving, attention, memory, social cognition, personality development, communication and various types of self-control and self-instruction which are key concerns for school (**Flavell, 1979**).

The study was unique in a sense that findings of the study would be helpful for teacher educators. Thus the present study has undertaken the task of examining the personality traits of Metacognitive functioning and its relationship with decision making among teachers.

1.1 MODELS OF METACOGNITION

The term Meta cognition is both a general term for "thinking about thinking," and a term used by a particular group of researchers to describe their field. There are numerous models of Meta cognition, far too many to describe here. To complicate things further, Meta cognition is a central component of several skill sets that are central to education and the workplace, including (1) reflective judgment, (2) critical thinking, (3) decision making, and (4) problem solving.

According to J. G. Borkowski & Thorpe, 1994; Como, 1986; Ghatala, 1986; Schloemer & Brenan, 2006; Barry J.Zimmerman, 1990, Metacognition is a five step process includes identifying the objectives, selecting the strategies, monitoring ease of use, orchestrating multiple strategies and evaluating strategies.

Figure 1.2: Five Step Process of Metacognition

Source: - J. G. Borkowski & Thorpe, 1994; Como, 1986; Ghatala, 1986; Schloemer & Brenan, 2006; Barry J.Zimmerman, 1990

A number of models have been proposed which are derived from different conceptualizations of Metacognition. Some are more general and provide a theoretical framework for Metacognition, such as Flavell's and Brown's models of Metacognition; others concentrate on specific aspects of Metacognition, such as knowledge of the structure of language, memory processes and Meta memory, studying from texts (e.g. The Tetrahedral Model for Learning from Texts by Brown et al. (1986)), and Metacognitive strategies for self regulation during reading.

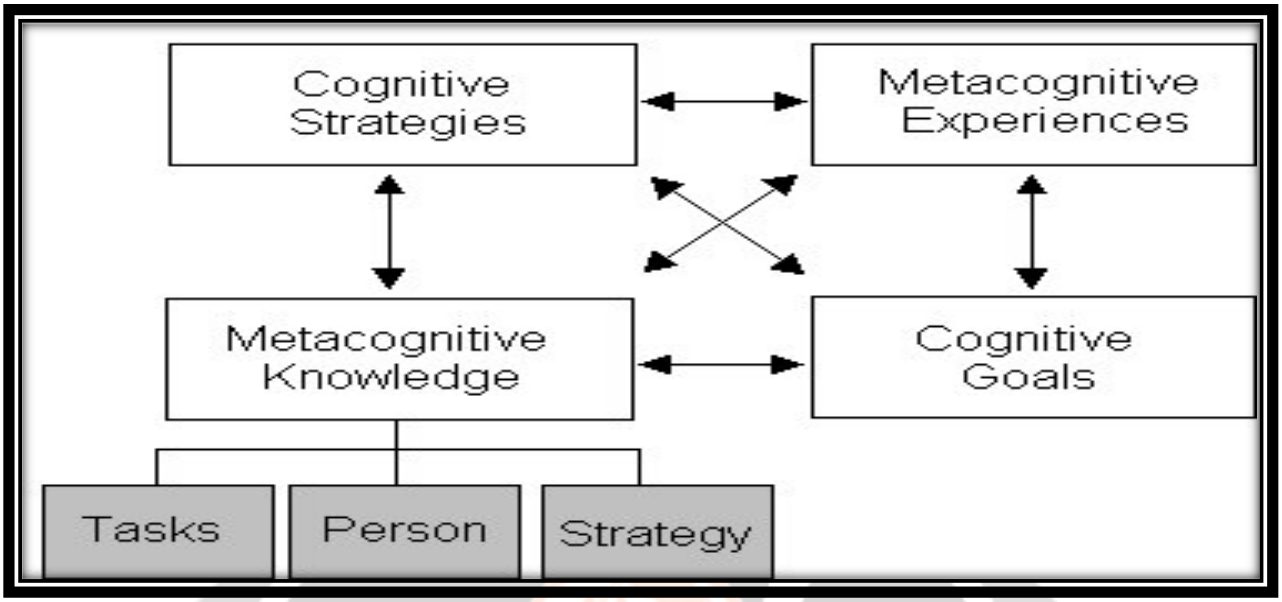
1.2 FLAVELL'S MODEL OF COGNITIVE MONITORING

In his classic article "Metacognition and Cognitive Monitoring", Flavell (1979) makes the first attempt to define the components of Metacognition by creating a model of cognitive monitoring/regulation. His proposal includes four components:

(a) Metacognitive knowledge,
(b) Metacognitive experiences,
(c) Goals or tasks,
(d) Actions or strategies.

A person's ability to control a wide variety of cognitive enterprises depends on the actions and interactions among these components.

Figure 1.3: Flavell's Model of Cognitive Monitoring



Source: - Flavell (1979)

Metacognitive knowledge is one's acquired world knowledge about cognitive processes, a personal perspective of one's own cognitive abilities as well as others. Flavell states that Metacognitive knowledge consists primarily of knowledge or beliefs about what *factors* or variables act and interact in what ways to affect the course and outcome of cognitive enterprises (Flavell, 1979, p. 907). He also identifies three general categories of these factors: the *person* category, the *task* category, and the *strategy* category.

Flavell, argues that Metacognitive knowledge does not differ in form and quality from other knowledge stored in long-term memory. As a consequence, it can either be retrieved as a result of a deliberate and conscious memory search, or it can be activated unintentionally and automatically by retrieval clues in the task situation. The latter situation is the most common. Metacognitive knowledge can be used unconsciously. However, it may also rise to consciousness and provoke what he calls a Metacognitive experience.

A **Metacognitive experience** is a cognitive or affective experience that accompanies a cognitive action. In other words, it is the conscious consideration of intellectual experiences that accompany any success or failures in learning or other cognitive enterprise (e.g. having a feeling of confusion after reading a text passage). Flavell affirms that many of these experiences have to do with where one is in a task and what sort of progress one is making or is likely to make.

The **goals** or tasks refer to the actual objectives of a cognitive endeavor, such as reading and understanding a passage for an upcoming quiz, which will trigger the use of Metacognitive knowledge and lead to new Metacognitive experiences. And finally, **actions** or strategies refer to the utilization of specific techniques that may assist in achieving those goals (e.g. a Metacognitive experience could be remembering that outlining the main ideas of a passage on a previous occasion had helped increase comprehension).

This model defines what Metacognitive knowledge is and what are the main factors that most likely influence its content and development.

1.3 BROWN'S MODEL OF METACOGNITION

Brown (1987) divides Metacognition into two broad categories: (1) knowledge of cognition, as activities that involve *conscious* reflection on ones cognitive abilities and activities; and (2) regulation of cognition, as activities regarding self-regulatory mechanisms during an ongoing attempt to learn or solve problems. According to Brown, these two forms of Metacognition are closely related, each feeding on the other recursively, although they can be readily distinguishable.

Knowledge about cognition refers to the stable, statable, often fallible, and often late developing information that human thinkers have about their own cognitive processes as it requires that learners step back and consider their own cognitive processes as object of thought and reflection; traditionally this has been referred to as *knowing that* (Brown, 1987).

Regulation of cognition consists of the activities used to regulate and oversee learning. These processes include planning activities (predicting outcomes, scheduling strategies, and various forms of vicarious trial and error, etc) prior to undertaking a problem; monitoring activities (monitoring, testing, revising, and re-scheduling one's strategies for learning) during learning; and checking outcomes (evaluating the outcome of any strategic actions against criteria of efficiency and effectiveness). It has been assumed that these activities are relatively unstable (although they are ubiquitously employed by adults on simple problems), not necessary statable (knowing how to do something does not necessarily mean that the activities can be brought to the level of conscious awareness and reported on to others), and relatively age independent (i.e., task and situation dependent).

Additionally, Brown introduced the concept of "autopilot state", arguing that expert learners (e.g. readers) monitor their comprehension and retention and evaluate their own progress in the light of the purposes for which they are learning to the extent that these activities become automatic and learners proceed as if in "automatic pilot". This concept tries to explain why Metacognitive learners (i.e. those who apply Metacognitive knowledge and skills in learning situations) sometimes are not conscious of their strategies and cannot describe their Metacognitive knowledge. This model emphasizes the *executive processes*, stressing the importance of the *control* that people bring or fail to bring to cognitive endeavors. Moreover, Brown points to important characteristics of regulation of cognition, those have to be taken into account for those interested in the applications of these concepts into instructional research.

1.3.1 TOBIAS & EVERSON'S HIERARCHICHAL

Tobias and Everson perceive Metacognition as a compound of skills and knowledge - knowledge of cognition, monitoring of one's cognitive and learning processes, and control of those processes. However, they organize these components into a hierarchical model, where the Metacognitive skill of *knowledge monitoring* is a pre-requisite for activating other Metacognitive skills.

They define **knowledge monitoring** (KM) as the ability of knowing what you know and knowing what you don't know. In their recent research report they affirm:

"That monitoring of prior learning is a fundamental or prerequisite Metacognitive process. If students cannot differentiate accurately between what they know and do not know, they can hardly be expected to engage in advanced Metacognitive activities such as evaluating their learning realistically, or making plans for effective control of that learning. Learners who accurately differentiate between what have been learned previously and what they have yet to learn are better able to focus attention and other cognitive resources on the material to be learned." (**Tobias and Everson, 2002, p. 1**)

Therefore, those who accurately distinguish between what they have already learned and what is yet to be acquired have an important advantage, since they can refrain from studying material that has already been mastered, or merely review it briefly. They assert that these students devote most of their time and energies to new, unfamiliar materials. In contrast, they argue that those students with less effective knowledge monitoring processes are likely to allocate their time and resources less effectively and spend valuable time studying what they already know at the expense of unfamiliar material and, consequently, have greater difficulty mastering new subjects (**Tobias et al., 1999**).

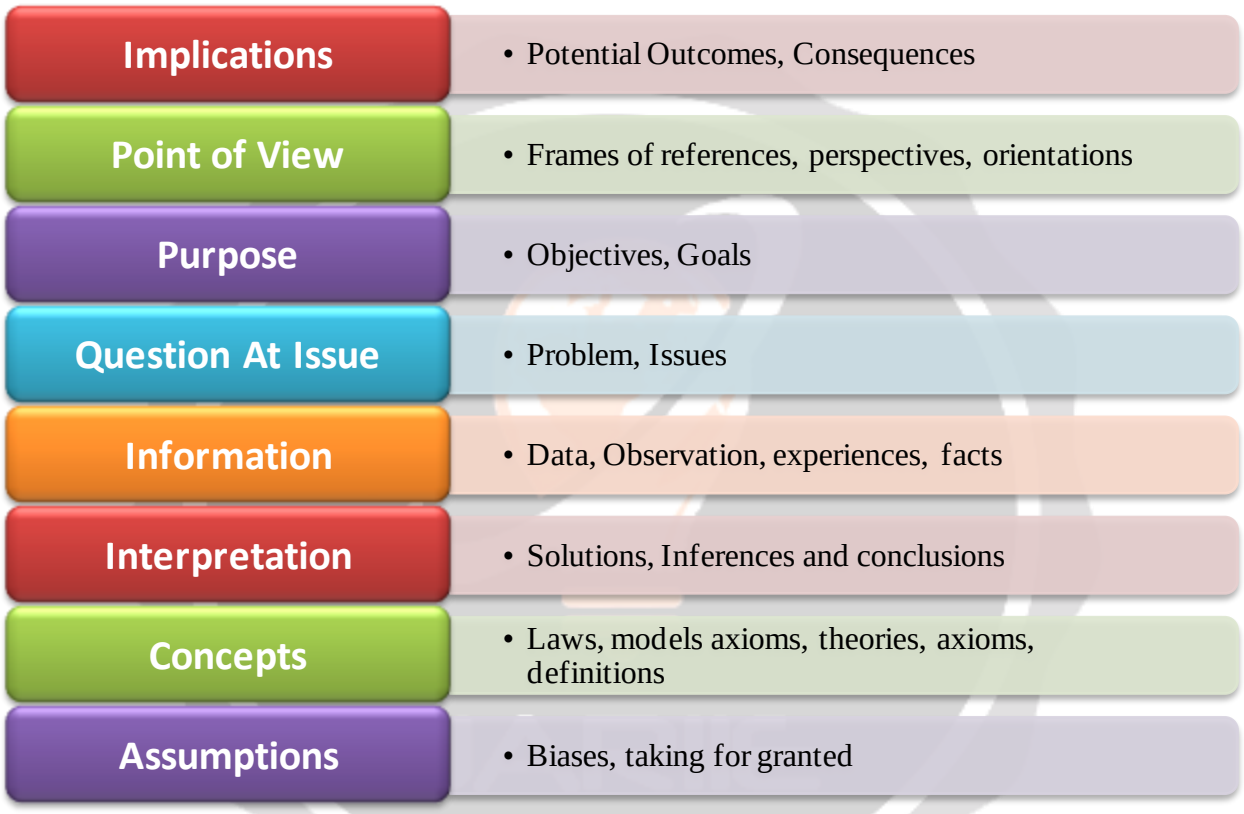
Tobias and Everson have investigated largely the monitoring aspect of Metacognition, based on the assumption that accurate monitoring is crucial in learning and training contexts where students have to master a great deal of new knowledge (Tobias et al., 1999). They have performed a series of empirical studies to investigate this aspect of Metacognition and its relationship to learning from instruction in different domains, focusing on issues such as domain specificity of knowledge monitoring, measurement concerns, and the relationship of knowledge monitoring to academic ability.

In this research we have adopted this model of Metacognition, building our computational framework based on the vision that promoting conscious development of knowledge monitoring, would lead to increasing of attention focus and appropriate allocation of cognitive resources and would, consequently, improve the other components of Metacognition, that are placed on the top of Tobias and Everson's pyramid. This model is particularly suitable for

this research because it enables us to focus on specific Metacognitive skills relevant for problem solving and provides an assessment instrument for one of these skills (i.e., knowledge monitoring).

In most people, the development of cognitive complexity progresses at different rates in different knowledge domains, depending upon experience and learning in particular domains. Cognitive development involves both knowledge acquisition and (largely unconscious) knowledge structuring. (If there is no knowledge to organize, then there is no development.) This structuring of knowledge depends on elements of thoughts like point of view, purpose, and question at issue, information, interpretation, concepts, assumptions and implications.

Figure 1.4: Elements of Thought



Source: - J. H. Flavell, 1981; Ruth Garner & Alexander, 1989; Glenberg, Wilkinson, & Epstein, 1982.

To increase their Metacognitive abilities, teacher trainee need to possess and be aware of three kinds of content knowledge: declarative, procedural, and conditional. **Declarative knowledge** is the factual information that one knows; it can be declared—spoken or written. An example is knowing the formula for calculating momentum in a physics class (momentum = mass times velocity). **Procedural knowledge** is knowledge of how to do something, of how to perform the steps in a process; for example, knowing the mass of an object and its rate of speed and how to do the calculation. **Conditional knowledge** is knowledge about when to use a procedure, skill, or strategy and when not to use it; why a procedure works and under what conditions; and why one procedure is better than another.

1.4 DECISION MAKING

Decision making is the process which helps to choose the best alternatives from many alternatives in a particular situation. It helps to find out the optional solution among many feasible solutions.

It is the thought process of select a logical choice from among the available options, when trying to make a good decision a person must weigh the positives and negatives of each option, and consider all the alternatives.

1.4.1 COMPONENTS OF DECISION

The most important aspect of structured decision making is to recognize and analyze the basic components of decisions.

1. **Context: -** The context describes the situation surrounding the decision. For example, the deadline and who needs to be involved to ensure a successful results.
2. **Objectives: -** A clear understanding of desired outcomes guides decision making and make it easier, logical and less stressful.
3. **Options: -** Significant effort must be spent uncovering all available options, studying how each may be implemented and what results they will produce. Too, often people limit themselves to a few obvious choices, and do not explore unusual ideas.
4. **Criteria: -** The criteria used to select the best possible options are determined by the context and objectives. Hard criteria are conditions which must be satisfied in order to have a useful decision, such as budget or time constraints. Soft criteria are conditions which require subjective assessment, and therefore can be more difficult to apply. Examples are level of organizational disruption and employee satisfaction.

1.4.2 RELATIONSHIP BETWEEN METACOGNITION AND DECISION MAKING

1. Metacognition and decision making are interrelated. As much higher the Metacognition level of the individual is, decision making capability / process will be more effective.

2. In this process of decision making Meta cognition is very important as it makes the individual able to think over it to take the best decision.

3. The individual will be able to evaluate / consider both the aspect negative and positive of the alternatives of the particular situations.

1.5 SIGNIFICANCE OF THE STUDY

Metacognitive skills are important for the life. People engage in cognitive activities, whether it is in home/office affairs or just watching a movie, or remembering an event. Metacognition plays a significant role in teaching, learning, social cognition, attention, self discipline, problem solving, communication and personality development. Knowledge of learning process will not guarantee good teaching, but, without it, teaching is simply a routine habit and trial and error procedure, many of which can be harmful to the students. An understanding of learning process and learners, will put the teacher in a better position to decide what can be done and how, what will not work and why (**Hartman, 2001**).

So this study has ability to show its novelty and applicability in various areas, which are as follows:

- **FOR THE CURRICULAR WORKERS**

Investigators are currently working on Metacognition is that they think it has important application to educational problems such as reading and writing. Poor readers and writer have been shown to have Metacognitive deficits in a wide variety of aspect of reading and writing. They are less likely than readers and writers to expand more time on difficult passages to review the passage least well learned and to adopt their reading activities to the demands and goals of reading task.

Metacognitive skills are necessary for effective school learning; perhaps the school curriculum can be modified to train then these skills. Several investigators had introduced various training programs for children to develop effective reading capabilities. These involve what has been called imported training, where children are not only promoted to use certain strategies but makes student more likely to use those strategies in their learning. When the students are being examined and this has resulted in improved reading, studying an academic problem solving skills.

Informed training where explanation and reasons are used as a catalytic factor for increasing learning capabilities, we are dealing with disciplining children or shaping their social and cognitive skills.

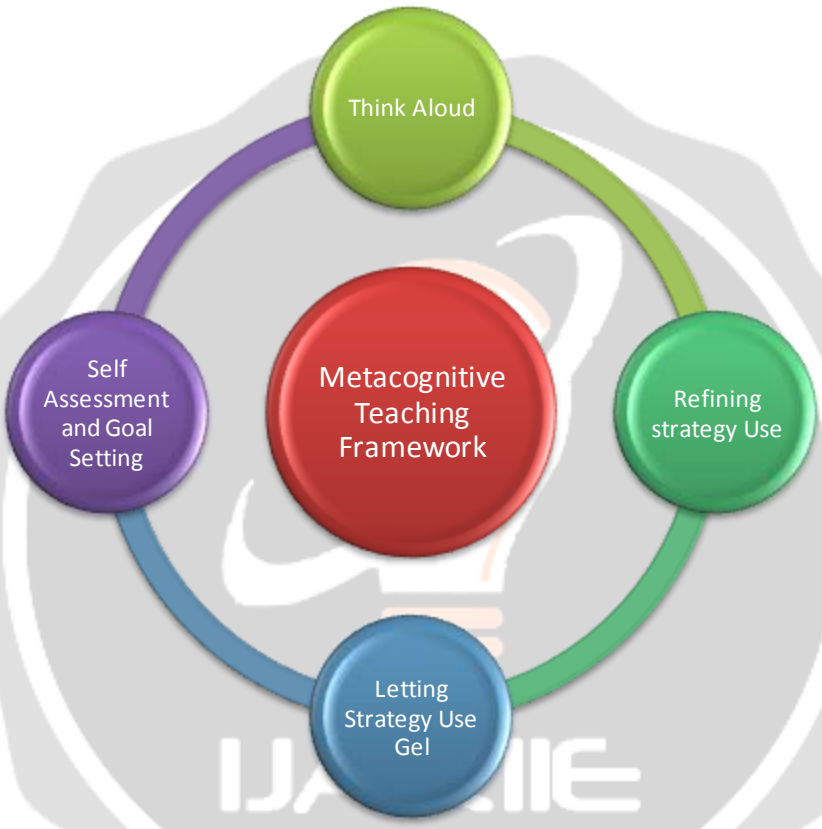
- **FOR THE TEACHERS**

The Metacognitive skills are significant skills and give very significant contribution in personality development of individual especially a teacher. So to improve such skills the teachers has to manipulate and modify their personality

traits and Metacognitive skills set. For this purpose they require a regular practice session and feedback of it, which could make them eligible to delete and modify their cognitive repertoire. Teacher must be aware of general Metacognitive principles before teaching, so that they can provide appropriate atmosphere of learning to the students. There are several techniques which can be used by imaginative teachers according to their subject areas and can encourage constructive Metacognitive and a deep approach for eg. Promoting self questioning as a model and using other students as a resource principally in a small group activity.

A Metacognition framework for teacher involves interactivity in reading, cooperative thinking, area studies, self assessment and goal setting.

Figure 1.5: Metacognitive Teaching Framework



- **FOR THE TAUGHT**

The role of Metacognitive skills in learning performance of a student plays significant role in developing a frame for improving their performance in various diversified fields. Performance do not have any specific rule for any student, it is only be controlled by the Metacognitive skills of a student. A student without Metacognitive skills will not be able to show his capabilities so that improvement in the Metacognitive skills of student will help a student to achieve the position in performances. Orienting them for self reflection in classroom situation help them to reflect their abilities and capabilities in entire class. And develops systematic academic activities and help to modify their strategies in the new situation for an expected result oriented action will definitely improve their performance.

- **FOR THE EDUCATIONAL RESEARCH**

In the present piece of investigation is the just of its own kind of investigation in this specific field and the study area. It shall have its major implication in the field of education research. Metacognition have great potentates for further researches. In foreign country a lot of work has been done in this area, but in India few researches has been done. The present study will serve as a spring board for further researchers.

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